

Journal of

Computational Physics

VOLUME 96, 1991



ACADEMIC PRESS, INC.

Harcourt Brace Jovanovich, Publishers

San Diego New York Boston

London Sydney Tokyo Toronto

Copyright © 1991 by Academic Press, Inc.
All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (27 Congress Street, Salem, Massachusetts 01970), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1991 articles are as shown on the article title pages; if no fee code appears on the title page, the copy fee is the same as for current articles.

0021-9991/91 \$3.00

This journal is printed on acid-free paper.



Printed by Catherine Press, Ltd., Brugge, Belgium

CONTENTS OF VOLUME 96

NUMBER 1, SEPTEMBER 1991

J. E. BOILLAT, F. BRUGÈ, AND P. G. KROPF. A Dynamic Load-Balancing Algorithm for Molecular Dynamics Simulation on Multi-processor Systems	1
MAN MOHAN RAI AND PARVIZ MOIN. Direct Simulations of Turbulent Flow Using Finite-Difference Schemes	15
A. FRIEDMAN, S. E. PARKER, S. L. RAY, AND C. K. BIRDSALL. Multi-scale Particle-in-Cell Plasma Simulation.	54
GEORGE MESINA AND CHARLES HALL. Iterative Solution of Navier-Stokes Dual Variable Difference Equations	71
S. P. HIRSHMAN AND O. BETANCOURT. Preconditioned Descent Algorithm for Rapid Calculations of Magnetohydrodynamic Equilibria.	99
F. LAFON AND S. OSHER. High Order Filtering Methods for Approximating Hyperbolic Systems of Conservation Laws	110
T. D. POINTON. Slanted Conducting Boundaries and Field Emission of Particles in an Electromagnetic Particle Simulation Code	143
J. U. BRACKBILL. FLIP MHD: A Particle-in-Cell Method for Magnetohydrodynamics	163
J. P. VALLEAU. Density-Scaling: A New Monte Carlo Technique in Statistical Mechanics	193

NOTES

S. BOUAOUDIA AND P. S. MARCUS. Fast and Accurate Spectral Treatment of Coordinate Singularities	217
FILIPPO BRUGÈ AND SANDRO L. FORNILI. On the Systolic Calculation of All-Pairs Interactions Using Transputer Arrays	224
PRABIR DARIPA. On a Numerical Method for Quasi-conformal Grid Generation	229
ABSTRACTS OF PAPERS TO APPEAR IN FUTURE ISSUES	237

NUMBER 2, OCTOBER 1991

HENNER EISEN, WILHELM HEINRICH, AND KRISTIAN WITSCH. Spectral Collocation Methods and Polar Coordinate Singularities	241
R. N. BARNETT, P. J. REYNOLDS, AND W. A. LESTER, JR. Monte Carlo Algorithms for Expectation Values of Coordinate Operators.	258

KENNETH S. BREUER AND LAWRENCE SIROVICH. The Use of the Karhunen-Loëve Procedure for the Calculation of Linear Eigenfunctions	277
PHILIPPE R. SPALART, ROBERT D. MOSER, AND MICHAEL M. ROGERS. Spectral Methods for the Navier-Stokes Equations with One Infinite and Two Periodic Directions	297
G. DiPESO, E. C. MORSE, AND R. W. ZIOLKOWSKI. δf and Particle Simulations of Parametric Instabilities	325
DEBORAH SULSKY AND J. U. BRACKBILL. A Numerical Method for Suspension Flow	339
L. S. MULHOLLAND AND D. M. SLOAN. The Effect of Filtering on the Pseudospectral Solution of Evolutionary Partial Differential Equations	369
LORRAINE G. OLSON, GEORGIOS C. GEORGIOU, AND WILLIAM W. SCHULTZ. An Efficient Finite Element Method for Treating Singularities in Laplace's Equation	391
IAIN D. BOYD. Vectorization of a Monte Carlo Simulation Scheme for Nonequilibrium Gas Dynamics	411
DAVID A. KOPRIVA. Multidomain Spectral Solution of the Euler Gas-Dynamics Equations	428
K. HSU AND S. L. LEE. A Numerical Technique for Two-Dimensional Grid Generation with Grid Control at All of the Boundaries	451
NOTES	
HAFEZ KOBESSI, ALI EL-HAJJ, AND MUNIF KOBERSI. A Simplified Shooting Method for the Diatomic Eigenvalue Problem	470
M. D. MATARRESE AND A. F. MESSITER. A Numerical Method for the Self-Similar Hypersonic Viscous Shear Layer	475
EDWARD J. CARAMANA. Derivation of Implicit Difference Schemes by the Method of Differential Approximation	484
AUTHOR INDEX FOR VOLUME 96	494